Patent Claims

1. Apparatus (1) for producing continuously molded bodies (5) from a molding material, such as a spinning solution containing cellulose, water and tertiary amine oxide, comprising a multitude of extrusion orifices (4) through which during operation the molding material can be extruded into continuously molded bodies (5), a precipitation bath (9) and an air gap (6) arranged between the extrusion orifices (4) and the precipitation bath (9), the continuously molded bodies (5) being passed during operation in successive order through the air gap (6) and the precipitation bath (9), and a gas stream (15) being directed in the area of the air gap (6) to the continuously molded bodies (5), **characterized in** that the air gap (6) directly after extrusion comprises a shielding zone (20) and a cooling area (19) separated from the extrusion orifices (4) by the shielding zone (20), the cooling area (19) being defined by the gas stream (15) designed as the cooling gas stream (15).

2. The apparatus according to claim 1, **characterized in** that in addition the first shielding zone (20), the air gap (6) comprises a second shielding zone (21) by which the cooling area (19) is separated from the precipitation bath surface (11).

3. The apparatus according to claim 1 or 2, **characterized in** that the width in the direction of passage (7) of the shielding zone (20) is dimensioned such that the shielding zone (20) in the direction of passage (7) extends at least over an expansion zone (24) of the continuously molded bodies (5) which directly follows extrusion and extends in the direction of passage (7).

4. The apparatus according to any one of the aforementioned claims, **characterized in** that the extrusion orifices (4) are arranged on a substantially rectangular base are in rows in a direction transverse to the direction (16) of the cooling gas stream (15).

5. The apparatus according to claim 4, **characterized in** that the number of the extrusion orifices (4) in row direction is greater than in the cooling gas stream direction (16).

6. The apparatus according to any one of the aforementioned claims, **characterized in** that the precipitation bath (9) has disposed therein a deflector (10) by which during operation the continuously molded bodies (5) are deflected as a substantially planar curtain (8) to the precipitation bath surface (11), and that outside of the precipitation bath there is provided a bundling means (14) by which during operation the continuously molded bodies (5) are united to form a fiber bundle (13).

7. The apparatus according to any one of the aforementioned claims, **characterized in** that the width (D) of the cooling gas stream (15) in a direction transverse to the direction of passage (7) of the continuously molded bodies (5) through the air gap (6) is larger than the height (B) of the cooling gas stream in the direction of passage.

8. The apparatus according to any one of the aforementioned claims, **characterized in** that the cooling gas stream (15) is composed of a plurality of individual cooling gas streams.

9. The apparatus according to claim 8, **characterized in** that the individual cooling gas streams are arranged side by side in row direction.

10. The apparatus according to any one of the aforementioned claims, **characterized in** that the cooling gas stream is designed as a turbulent gas flow in the area where the continuously molded bodies (5) are passed through the air gap (6).

11. The apparatus according to any one of the aforementioned claims, **characterized in** that the cooling gas stream (15) has a velocity component oriented into the direction of passage (7).

12. The apparatus according to any one of the aforementioned claims, **characterized in** that the inclination (β) of the cooling gas stream (15) in the direction of passage (7) is greater than the expansion (γ) of the cooling gas stream (15).

13. The apparatus according to any one of the aforementioned claims, **characterized in** that the molding material prior to its extrusion has a zero shear viscosity of at least 10000 Pas, preferably at least 15000 Pas, at 85°C.

14. The apparatus according to any one of the aforementioned claims, **characterized in** that the distance of the cooling area (19) from each extrusion orifice (4) in the direction of passage (7) is at least 10 mm each time.

15. The apparatus according to any one of the aforementioned claims, **characterized in** that the distance l of the cooling area (1) in the direction of passage (7) from each extrusion orifice (4) in millimeters satisfies the following inequality:

$$l > H + A \bullet [\tan(\beta) - 0.14]$$

where H is the distance of the upper edge of the cooling gas stream in the direction of passage from the plane of the extrusion orifices at the exit from the blowing means (14) in millimeters, A is the distance in a direction transverse to the direction of passage between the exit of the cooling gas stream (15) of the blowing means (14) in millimeters and the row (22) of the continuously molded bodies (5) that is the last one in flow direction (16), in millimeters, and β is the angle in degrees between the cooling gas stream direction (16) and the direction transverse to the direction of passage (7).

16. The apparatus according to any one of the aforementioned claims, **characterized in** that the height L of the air gap (6) in the direction of passage (7) in millimeters satisfies the following inequality:

$$L > I + 0.28 \bullet A + B$$

where I is the distance of the cooling area (19) from the extrusion orifices (4) in the area where the continuously molded bodies (5) are passed through the air gap (6), A is the distance in a direction transverse to the direction of passage (7) between the exit of the cooling gas stream (15) from the blowing means (14) and the row (22) of the continuously molded bodies (5) that is the last one in flow direction (16), in millimeters, and B is the height of the cooling gas stream (15) in a direction transverse to the cooling gas stream direction (16) in the direction of passage (7) at the exit of the cooling gas stream (15) from the blowing means (14).

17. The apparatus according to any one of the aforementioned claims, **characterized in** that the first shielding zone consists essentially of air.

18. A method for producing continuously molded bodies (5) from a molding material, such as a spinning solution containing water, cellulose and tertiary amine oxide, the molding material being first extruded to obtain continuously molded bodies, the continuously molded bodies being then passed through an air gap (6) and stretched in said air gap and blown at with a gas stream (15), and the continuously molded bodies being then guided through a precipitation bath (9), **characterized in** that the continuously molded bodies (5) in the air gap (6) are first passed through a shielding zone (20) and then through a cooling area (19), the blowing operation being performed in the cooling area by means of the gas stream designed as the cooling gas stream.

19. The method according to claim 18, **characterized in** that the continuously molded bodies (5) after the cooling area (19) are passed through a second shielding zone (21) before they immerse into the precipitation bath.

20. The method according to claim 18 or 19, **characterized in** that the velocity of the cooling gas stream, w_0, in dependence upon its width B, is set in the direction of passage of the continuously molded bodies by the air gap such that the Reynolds number formed with w_0 and B is at least 2500.

21. The method according to any one of claims 18 to 20, **characterized in** that the specific blowing power of the cooling gas stream (15) is set to a value of at least 5 mN/mm.